From Research to Market Take-up

Francisco Gonzalez Balmas, TMB
Electric Buses?
Big interest from Stakeholders

Current Fleet

- Diesel: 79%
- Biodiesel: 9.9%
- CNG: 7%
- Biogas: 0.6%
- Electricity: 1.2%
- Other: 2.3%

Ventilation by propulsion energy

Future Fleet Projection

- Diesel: 34%
- Biodiesel: 18.9%
- CNG: 28.3%
- Biogas: 13.2%
- Electricity: 41.5%
- More fully electric with batteries: 69.7%
- More plug-in hybrids: 45.5%
- More fully electric trolley: 33.3%
- More fuel cells: 12.5%
- Other: 13.2%

Ratio of answers for Fleet renewal function of propulsion types considered

+ 41.5%
Electric Buses?
It is not only the Bus!

Continuous charging
• Expensive infrastructure
• Loses flexibility

Overnight charging
• Heavy vehicles
• Reduced capacity

Opportunity charging

Inductive charging
• Expensive vehicles
• Magnetic shielding
• Expensive installation
• Low energy transfer efficiency

Conductive charging
• Expensive infrastructure
• Loses operational flexibility?

Credits: Volvo/Siemens/Iveco
TOP Challenge 1

High Cost

- E-bus = 2 x the price of a conventional bus
- Battery = 45% of the e-bus cost
- Battery lifetime is key
- Cost of the charging infra and installation must be added to the above
- Depreciation rules
- TCO: maintenance cost
TOP Challenge 2

Operational risks

• What operational range?
• What reliability?
• Does the ebus performance = conventional bus performance?
• A good analysis of the operational needs is key: imagine which type of bus can work on which line, always using the system approach.

A chosen technology performs well if put in its “best operational conditions”

Source: EBSF Project (DG-R&I) [www.ebsf.eu](http://www.ebsf.eu)
Study by VDV and Prof. Dr. Ralph Pütz (Landshut University)
Contractual barriers

• Contract length & extensions
• Functions / Responsibilities sharing between PTO & PTA
• Who to pay what cost?
TOP Challenge 4

Interoperability & flexibility

• What flexibility of the operations with a dedicated infrastructure?
• Charging infrastructure standardization is **key**
• Slow charging - overnight
• Fast charging – opportunity
Interaction with Energy providers

- Urban location for charging point
- Quality of the electricity distribution network
- Stability of electricity cost
10 ZeEUS Demonstrations

~70 electric buses
• 12 meters, articulated, double-deckers
• Plug-in Hybrid, Full-electric, Battery Trolleys

Energy supply mode:
• plug-in, conductive, inductive, overhead

Charging strategies
• Overnight (depot)
• Opportunity (terminals, bus-stops)

Fast / Slow Charging
ZeEUS
Core Demonstrations

PLUS OTHER 30
OBSERVED CITIES
> 300 BUS

LONDON
PARIS
BARCELONA
CAGLIARI

RANDSTAD
BONN
WARSAW
PLZEN
MÜNSTER
Evaluation bottom line approach: categories of indicators

**People**
- Fair and beneficial business practices toward labour and the community and region in which an organization conducts its business.

**Profit**
- Economic value created by the organization after deducting the cost of all inputs, including the cost of the capital tied up.

**Planet**
- Sustainable environmental practices, benefit to the natural order as much as possible or at the least do no harm and minimise environmental impact.

**Technical and Operational Data**
- Surrounding conditions: route description, buses in operation, number of charging points...

187 indicators identified
Global evaluation of results for…

- Identification of the **most relevant KPIs for e-buses**
- Supporting **procurement** for future investments in **electric bus systems**
- **Analyse transferability of site-specific results**
- Compiling a **single handbook** covering sustainability performance assessment
- Support to **feasibility** and **decision making**, **modelling** and **standardisation**
- **NO DEMO-to-DEMO BENCHMARKING!**
- **NO TECHNOLOGY-to-TECHNOLOGY BENCHMARKING!**
A set of tools and guidelines answering the stakeholders needs

**IF – Know & Decide**

**WHEN – Plan, Regulate & Fund**

**WHAT – Select & Procure**

**HOW – Operate & Maintain**
NOVELOG: Guiding Cities to sustainable city logistics

Dr. Georgia Ayfantopoulou
NOVELOG Project Coordinator
Hellenic Institute of Transport (HIT)
Centre for Research and Technology Hellas (CERTH)
Agenda

- Electric Vans in city logistics (?): challenges & opportunities
- The NOVELOG Project – An Overview
- NOVELOG and Electromobility
- Conclusions
Electric vans in city logistics: challenges & opportunities

**Advantages**

- Increased Range for City Logistics (100 to 200km)
- Increased output (increased speeds max. 80-90km/hr)
- Potential for inclusion of additional power (i.e. solar panels, non-fossil fuel sources) to extend range
- No CO2 emissions
- Reduced noise pollution

**Challenges**

- Requires new infrastructure (network of recharge stations for achieving greater vehicle ranges)
- Increased purchasing costs
- Battery toxicity (environmental waste management issues)
- Logistics sector is very fragmented with low level of innovation adoption
Electric vans in city logistics: challenges & opportunities

**EU Goals**

* CO2 free city logistics by 2030
* Reduction of noise pollution from freight
* Reduction of carbon dependent technologies
* Promote joint public procurement for low emission vehicles in commercial fleets

**Dynamics**

* E-mobility is a sustainable answer to these requirements
* Barriers do exist in terms of:
  * Decarbonazation of electrification
  * New infrastructure
  * New interfaces
  * New Business models
* Support from authorities (local, national, int)
  * What Mayors really like about electromobility?
  * Why its easier to implement in small cities?
  * Common problem pass/ger & freight e-mobility?
* E-mobility is important for improving the competitiveness of EU automotive industry
  * How we will involve them for flexible & economically viable solutions in city logistics?
Electric vans in city logistics (?): challenges & opportunities

Integrated approach for UFT is needed in the “complexity” of the new era for sustainable cities of the future.
### Electric vans in city logistics (?) : challenges & opportunities

<table>
<thead>
<tr>
<th>Approach</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(1) Infrastructure</strong></td>
<td>Development of bypasses/ring roads, urban distribution centers, loading facilities</td>
</tr>
<tr>
<td><strong>(2) Regulatory</strong></td>
<td>Introduction of fuel taxes, road user charge, dedicated freight, impose vehicle restrictions, introduce congestion charging</td>
</tr>
<tr>
<td><strong>(3) Logistical</strong></td>
<td>Use of small delivery vehicles, improved terminal operations, improve driver competencies</td>
</tr>
<tr>
<td><strong>(4) Co-operative</strong></td>
<td>Form freight partnerships load sharing systems (increase load factors), joint delivering</td>
</tr>
<tr>
<td><strong>(5) Technology</strong></td>
<td>Use of electric delivery vehicles, use of ITS, implement a vehicle parking reservation system</td>
</tr>
<tr>
<td><strong>(6) Behavioral</strong></td>
<td>Implement anti idling messages, improve social acceptance of urban freight activities, use of recommended truck routes</td>
</tr>
</tbody>
</table>
The NOVELOG Project

- NOVELOG - New Cooperative Business Models and Guidance for Sustainable City Logistics

- Objective:
  - enabling of knowledge and understanding of urban freight distribution and service trips by providing guidance for implementing effective and sustainable policies and measures for sustainable city logistics
Approach for cooperative logistics

- City authorities
  - Quality of life
  - User satisfaction

- Citizens
  - Traffic conditions and environment
  - Business opportunities
  - Green UFT
  - Load factor
  - Vehicle kilometers

- Logistics customers (shippers, receivers, etc.)
  - User generalized cost
  - User satisfaction
  - Public acceptance

- LSPs (operators, etc.)
  - Business opportunities
  - Business profile
  - Service quality
  - Transportation cost
  - Load factor
  - Vehicle-kilometers

- Admin + CoLog

CoLog – Cooperative Logistics
Admin - Administrative and Regulatory schemes and incentives

Consensus
**NOVELOG Expected Results & Impacts**

- **improved understanding of cost effective** (non-vehicle technology based) **strategies, measures & business models** to reduce the carbon footprint of logistical operations in cities;

- **increased load factors and reduced vehicle movements** resulting in cost and emission benefits;

- **optimized governance and stakeholders’ cooperation** in urban distribution through a more powerful, consensus-oriented DSS;

- **strengthened capacity of local authorities & stakeholders for sustainable policy making (SUMPs)**, by providing tools for managing “implementation chain” (problem capture - decision – planning – testing – assessment – adjustment - implementation).

- Impact EU Policy implementation.

- Impact **innovation and integration of new knowledge to strengthen competitiveness and growth**.
4 Steps – 4 Tools

1. Understand - 'Understand-ing Cities'
2. Focus - 'Toolkit'
3. Assess - 'Evaluation tool'
4. Guide - 'Guidance tool'

Common Data Collection & Evaluation Framework for UFT
From Pilots ……. to integrated SULPlanning

novelog
## Tools’ overview

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Objective</th>
<th>Output</th>
<th>Tool type</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Understanding cities’ tool</td>
<td>To define the key factors influencing UFT development &amp; their expected evolution</td>
<td>A list of the key factors influencing UFT, their impact areas and their expected evolution in 2 future time horizons</td>
<td>Web platform</td>
</tr>
<tr>
<td>‘Toolkit’</td>
<td>To guide cities in selecting the most appropriate UFT solutions for their case</td>
<td>A list of the most appropriate combinations of measures &amp; interventions based on the city’s typology</td>
<td>Web platform</td>
</tr>
<tr>
<td>‘Evaluation’ tool</td>
<td>To provide cities with evidence on whether to select a specific UFT measure (exante/expost)</td>
<td>A ranking of alternative UFT measures based on their assessed impact and contribution to cities LSI</td>
<td>Web platform</td>
</tr>
<tr>
<td>‘Guidance’ tool</td>
<td>To support the process of defining the best business model (BM)s for each city</td>
<td>Characteristics of alternative and selected business model for each city (based on the BM Canvas structure)</td>
<td>Framework</td>
</tr>
</tbody>
</table>
6 Pilots and 6 Case Studies

External City network of 30 cities
International Quality Assurance Panel

Pilots
- Mechelen
- Graz
- Turin
- Rome
- Athens
- Barcelona

Case studies
- Gothenburg
- Copenhagen
- London
- Venice
- Emilia-Romagna Region
- Pisa

Different typology & maturity levels of cities.
Multi-stakeholders platforms in each city
One approach
## 6 Pilots and 6 Case Studies

<table>
<thead>
<tr>
<th>Pilot cities</th>
<th>Innovative Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athens</td>
<td>Business cooperation between road and rail transport providers</td>
</tr>
<tr>
<td>Turin</td>
<td>Flexible use of public infrastructure by ITS</td>
</tr>
<tr>
<td>Graz</td>
<td>Home deliveries system for small shops</td>
</tr>
<tr>
<td>Rome</td>
<td><strong>DSS for city logistics measures</strong></td>
</tr>
<tr>
<td>Barcelona</td>
<td><strong>Super-blocks planning in a city logistics perspective</strong></td>
</tr>
<tr>
<td>Mechelen</td>
<td>Shops and bike couriers cooperation for urban freight deliveries</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case Study Cities</th>
<th>Innovative Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emilia Romagna Region</td>
<td>Harmonization of city logistics rules among cities</td>
</tr>
<tr>
<td>Gothenburg</td>
<td>Care off addresses and use of the existing logistics platforms for consolidation</td>
</tr>
<tr>
<td>Venice</td>
<td>Using public transport for freight last mile deliveries</td>
</tr>
<tr>
<td>Copenhagen</td>
<td>Formalized freight network for defining incentives to improve demand management</td>
</tr>
<tr>
<td>Pisa</td>
<td><strong>UDC business and operational model</strong></td>
</tr>
<tr>
<td>London</td>
<td>Freight travel plan and behavioral change policies</td>
</tr>
</tbody>
</table>
Three (3) city pilots promoting electromobility in city logistics:

* **Barcelona**
  * **Promotion strategy**: electric fleet being part of an innovative project for freight delivery

* **Pisa**
  * **Promotion strategy**: provision of incentives to local carriers in the context of an integrated SULP approach.

* **Rome**
  * **Promotion strategy**: electric van sharing experiment for data collection & technical justification - convincing through argumentation.

Car Industry view on electric vans adoption strategies in city logistics

Business models for facilitating electric fleets taken up in city logistics in conjunction with other measures.
The Pilot of Barcelona

- **Better understanding the Urban Distribution Grid** to better design the freight distribution in the new city model of super-blocks.

- **Last mile delivery using low emission modes** (electric vehicles, cargo bikes).

- **Cooperative logistics business model** for the operation and performance of the last mile distribution within the super-blocks.
The Pilot of Pisa

- identification the population of carriers
- monitor and manage the access of freight vehicles within the city
- send alert information via mobile app to goods carriers for a better organization of transport of goods
- encourage the use of electric vehicles within the LTZ for local exchange carriers
- Develop the implementation plan for integration of urban freight management solutions
The Pilot of Rome

- Design and development of a urban freight Decision Support System (DSS)
- Field trials monitoring and evaluation:
  - Low emission vehicles performing the last mile distribution under freight traffic restrictions and regulations
  - Urban Consolidation Centres in combination with electric vehicles
  - Electric Van-Sharing experiments
NOVELOG will:

1. Validate the benefits of using electric vehicles and electric bikes for urban freight in conjunction with other measures (UDCs, LTZs).

2. Test and validate e-mobility solutions contribution in improving the sustainability of city logistics and meeting the requirements of the stakeholders. Examine and implement measures to promote and provide incentive to logistics industry to take-up such solutions.

3. Test new cooperative business models to increase the sustainability of these solutions and achieve consensus between city stakeholders on what the roles, requirements and expectations of each stakeholder are in such business models.
NOVELOG & electromobility

NOVELOG will:

4. Promote electromobility solutions and measures in the context of integrated SULP for new funding schemes of authorities and stakeholders for purchasing of new infrastructure/technology to move towards this goal.

5. “D7.3 Business Models for UFT solutions” will have special reference on establishing sustainable Business Models for effective implementation of e-mobility solutions for UFT in cities including car industry view (Renault).

6. Sustainable UFT Solutions & relevant Impact inventory (Toolkit) will include & structurally present past experience in all e-mobility solutions & measures implemented for UFT & the achieved impact.
Join us...!!!

www.novelog.eu
Thank you

Dr. Georgia Ayfantopoulou
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novelogoffice@certh.gr
www.novelog.eu

#eMSF2016
@eMobilityForum
Back up slides
Conclusions

* Validate the benefits of using electric vehicles and electric bikes for urban freight in conjunction with other measures (UDCs, LTZs).

* Implement and validate the cooperative business models required for the effective deployment of the measures in the NOVELOG cities. Identification of the required characteristics/relations for successful co-operation and operation.

* Evaluate the role of the local and national authorities in providing incentives and restrictions for the successful take-up of electric vehicles for Urban Freight Transport.

* Research can help move towards take-up by demonstrating the benefits and potential of the use of electric freight vehicles. Industry is taking fast steps in improving technology and reducing the cost which is one of the main hurdles.
NOVELOG Added Value for Electromobility

* NOVELOG Focus on Business Models and guidance for development of sustainable business models for UFT.

* Facilitate stakeholders to implement the guidance Strategy, enable the development/modification of their own Business Models and integrate urban logistics concerns and strategies.

* “D7.3 Business Models for UFT solutions” to include chapter on establishing sustainable Business Models for effective implementation of electromobility solutions for UFT in cities (Renault).
Developing tools for managing the “implementation chain”

4 Tools:
- Understanding Cities
- Evaluation
- NOVELOG Toolkit
- Guidance

Activities:
1. Understanding urban freight and service trips
   - Data collection
   - Drivers identification
   - Scenario development
2. Development of a modular evaluation framework
   - LCA, SCBA, Behavioral modelling, Adaptability and Transferability, Risk Analysis, MS-MCA D-M
3. Crafting of Toolkit of policies and measures
   - City typology
   - Measures and impacts identification
   - Measures ranking
4. On-site implementation
5. Impact assessment (Evaluation)
6. Business models and Guidance
   - Guidance Strategy for SULP implementation
   - City logistics business models
Barcelona
- better understanding the Urban Distribution Grid to better design the freight distribution in the new city model of super-blocks
- Last mile delivery using low emission modes (electric vehicles, cargo bikes)
- Cooperative logistics business model for the operation and performance of the last mile distribution within the super-blocks

Pisa
- monitor and manage the access of freight vehicles within the city
- encourage the use of electric vehicles within the LTZ for local exchange carriers
- Develop the implementation plan for integration of urban freight management solutions

Rome
- Design and development of a urban freight DSS
- Field trials monitoring and evaluation:
  - Low emission vehicles performing the last mile distribution under freight traffic restrictions and regulations
  - Urban Consolidation Centres in combination with electric vehicles
  - Electric Van-Sharing experiments
Taking Fuel Cell Buses to Market

Jean-Luc Delplancke
Head of the Programme Unit
Fuel Cells and Hydrogen 2 Joint Undertaking

#eMSF2016
@eMobilityForum
Shifting public awareness towards sustainability and eco-friendliness requires new sustainable transport solutions

Europeans perceive major environmental problems...

> 50% of Europeans think that climate change is one of the three most important challenges our world faces
> 81% say that air pollution is an important problem
> 72% of citizens say that noise pollution is a problem in their cities

...to be caused by the transport sector...

> 63% feel that transport is a main threat to air quality
> 56% of Europeans think pollution can be reduced by improving public transport
> 71% of European citizens say that electric cars are the most environmentally friendly mode of transport

...and want local authorities to solve them

> 56% of Europeans think that public transport can best be improved by city authorities
> 72% of Europe's population believe that public authorities aren't doing enough to improve air quality

Source: Eurobarometer "Climate Change" (2014); Eurobarometer "Urban Mobility" (2013); Eurobarometer "Air quality" (2013)
FC buses are the most flexible zero emission option – clean like battery electric, they can be operated like diesel buses

- **High daily ranges**
  ... of 300 km on average without refuelling – Extension possible

- **Performance**
  ... comparable to diesel buses, e.g. acceleration or gradeability

- **Full route flexibility**
  ... not bound to any required infrastructure on the route

- **Fast refuelling**
  ... down to 7 minutes possible – Also several refuelling cycles per day possible

- **High passenger comfort**
  ... due to reduced noise levels and smooth driving experience

- **Close to technology maturity**
  ... with more than ten years and 8 m km of operational experience

Note: For a comparison of different alternative powertrain solutions please refer to the study "Urban buses: Alternative powertrains for Europe"
**Strong Public-Private Partnership with a focused objective**

Industry-led Public-Private Partnership (PPP)

**Fuel Cells & Hydrogen Joint Undertaking**

- **Hydrogen Europe**
  - Industry Grouping
  - 95 members
  - ~50% SME

- **European Union**
  - Represented by the European Commission

- **ONERGHY**
  - Research Grouping
  - 63 members

The Joint Undertaking is managed by a Governing Board composed of representatives of all three partners and led by Industry.

To implement an optimal research and innovation programme to bring FCH technologies to the point of market readiness by 2020.

Council Regulations:
- 521/2008 of 30 May 2008 (FP7)
- 1183/2011 of 14 November 2011
- 559/2014 of 6 May 2014 (H2020)
### Situation and Outlook in Europe:

91 buses in operation or about to start

#### Ongoing EU-funded fuel cell bus projects

<table>
<thead>
<tr>
<th>Project</th>
<th>City</th>
<th>Number of FC Buses</th>
<th>Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIC</td>
<td>Bolzano, IT</td>
<td>5</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td>Aargau, CH</td>
<td>5</td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td>London, UK</td>
<td>8</td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td>Milan, IT</td>
<td>3</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td>Oslo, NO</td>
<td>5</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td>Cologne, DE*</td>
<td>4</td>
<td>2011/14</td>
</tr>
<tr>
<td></td>
<td>Hamburg, DE*</td>
<td>6</td>
<td>2011/2015</td>
</tr>
<tr>
<td>High V.LO-City</td>
<td>Liguria, IT</td>
<td>5</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Antwerp, BE</td>
<td>5</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Aberdeen, UK</td>
<td>4</td>
<td>2015</td>
</tr>
<tr>
<td>HyTransit</td>
<td>Aberdeen, UK</td>
<td>6</td>
<td>2015</td>
</tr>
</tbody>
</table>

#### 3Emotion

<table>
<thead>
<tr>
<th>City</th>
<th>Number of FC Buses</th>
<th>Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cherbourg, FR</td>
<td>5</td>
<td>2016/17</td>
</tr>
<tr>
<td>Rotterdam, NL</td>
<td>4</td>
<td>2016/17</td>
</tr>
<tr>
<td>South Holland, NL</td>
<td>2</td>
<td>2016/17</td>
</tr>
<tr>
<td>London, UK</td>
<td>2</td>
<td>2016/17</td>
</tr>
<tr>
<td>Flanders, BE</td>
<td>3</td>
<td>2016/17</td>
</tr>
<tr>
<td>Rome, IT</td>
<td>5</td>
<td>2016/17</td>
</tr>
</tbody>
</table>

#### Current national/regional-funded fuel cell bus projects

<table>
<thead>
<tr>
<th>City</th>
<th>Number of FC Buses</th>
<th>Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karlsruhe, DE*</td>
<td>2</td>
<td>2013</td>
</tr>
<tr>
<td>Stuttgart, DE*</td>
<td>4</td>
<td>2014</td>
</tr>
<tr>
<td>Arnhem, NL*</td>
<td>3</td>
<td>2016/17</td>
</tr>
<tr>
<td>Groningen, NL*</td>
<td>2</td>
<td>2016/17</td>
</tr>
<tr>
<td>Brabant, NL*</td>
<td>2</td>
<td>2016/17</td>
</tr>
</tbody>
</table>

#### Legend

- **CHIC countries**
- In operation
- Planned operation

(2015) Operation start/planned start

* Co-financed by regional/national funding sources

---

Last update: October 2015
FCH JU Projects: Achievements and Challenges

Achievements

• As flexible as diesel buses
  – Full operations: 12-20hr daily shifts
  – Short refuelling time

• Cost reduction

• Efficient electric drivetrain

Challenges

• Availability
• Spare parts
• Time to repair
• Trained staff
• Cost of FCBs, Infrastructure/H2

61M€ for 67 buses from 4 projects in 12 locations

Volumes bring lower costs and mature supply chain
Must define volumes that enable commercial market and pathway to achieve them

Early indications from suppliers indicate need to reach 500-1000 buses for market

How to achieve those figures within the FCH JU programme?

Must gauge purchase appetite as costs decrease to avoid valley of death and obtain commitments thereof

Commercialisation Study
A broad stakeholder coalition of >80 organizations has been established including operators and local governments from 45 locations.
Users and suppliers agree on the need for action

5 leading bus suppliers and 30 cities/operators have made clear public statements of their commitment to support commercialisation of FC buses

**Bus Suppliers Letter of Understanding**

LoU presented to demand side representatives in an Handover-Ceremony in Brussels, 12 November 2014

Left to right: First Mayor Olaf Scholz (Hamburg), Deputy Mayor Kit Malthouse (London), Filip van Hool (CEO Van Hool), Dariusz Michalak (Deputy CEO Solaris), Rémi Henkemans (Managing Director VDL Bus & Coach), Gustav Tuschen (Head of Product Engineering Daimler Buses)

**Letter of Understanding of Transport Operators and Public Authorities**

LoU handed over to the EU Commissioner of Transport at the TEN-T Days in Riga on 23 June, 2015

Left to right: Bert de Colvenaer (FCH JU Executive Director), Pierre-Etienne Franc (NEW-IG Chairman), Nils Usakovs (Mayor of Riga), Els de Wit (Head of Clean Fuels at the Dutch Ministry of Infrastructure and the Environment), Kirsten Holling (Ministry for Building, Housing, Urban development and Transport NRW), Violet Bulc (Commissioner for Transport), Bernard Frois (IPHE Chairman), Catherine Trautmann (European Coordinator North Sea-Baltic Corridor), Kurt Bodewig (European Coordinator Baltic-Adriatic Corridor), Florian Mussner Councillor for Mobility of South Tyrol-Bolzano
Fuel cell bus deployment plans – European level

Potential no. of FC buses in projects under development by bus length (12m / 18m) and cluster

Note that these are provisional estimates based on the data from cities/operators collected within each cluster. No firm commitment has been made to procure fuel cell buses by any parties involved. While the cluster coordinators have sought to provide realistic and relatively conservative deployment numbers, in practice these figures may well fall as more detailed local feasibility work is undertaken.

Comments

• Early figures indicate >500 fuel cell buses
• Overall level of investment: 1.5B€
• On-going engagement with bus industry to ensure demand can be met
Call for proposals included topic for large scale validation of fuel cell bus fleets – max. funding of 32M€

- Requires:
  - At least 100 buses in total
  - At least 3 cities with 20 buses
  - At least 10 buses per participating location
  - Maximum price for standard 12m bus: 650,000€

- Provides:
  - Up to 200,000€ per standard 12m bus
  - Up to 1.2M€ for large stations, up to 600,000€ for small fleets

Politically
There is a push for reducing emissions in public transport

Environmentally
FC buses help to reduce noise levels, to green cities and public transport

Operationally
FC buses are the most flexible zero emission option

Economically
FC buses reduce external costs of public transport

Organisationally
The coalition and the FCH JU support operators in introducing FC buses
Contact us:

• Street address: Avenue de la Toison d’Or 56-60 B-1060 Brussels Belgium
• Postal address: FCH JU - TO56 4/29, B-1049 Brussels Belgium
• Tel: +32 2 221 81 29
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Further info:

• FCH JU: http://www.fch.europa.eu/
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